

Simulated Oil Spill - June 20, 2001 (Revised 5/7/2010)

Criteria for Determining “How Clean is Clean?” Prepared by Harry L. Allen, Ph.D., USEPA

Cleanup Goals will vary during each phase of the project depending upon the medium (water, in-place soil or sediment), and by the intended use of the resource (e.g., bathing beaches, other beaches, or turtle nesting habitat).

Phases of Response:

Phase 1. Emergency - Primary Containment and Recovery

Phase 2. Removal - Secondary Recovery and Treatment

Phase 3. Long-term Removal - Tertiary Recovery, Treatment and Natural Attenuation

Cleanup Criteria

PHASE 1 - EMERGENCY		SOIL	SEDIMENT	WATER COLUMN	COMMENTS
Marshes	Oil	No pooled or potentially mobile oil		No brown oil or brown sheen	2.6 gal./acre-ft = 7 mg/l; 2.16 gal/acre = dark sheen (5.8 mg/l)
Bathing Beaches	Oil	Limited staining or submerged oil may be present	Rainbow sheen may occur when disturbed	No brown oil or brown sheen	
Other Beaches	Oil	Limited staining or submerged oil may be present	Rainbow sheen may occur when disturbed	No brown oil or brown sheen	
Turtle Nesting Areas	Oil	No surface oil	Rainbow sheen may occur when disturbed	No brown oil or brown sheen	
Subtidal Zone	Oil	Not Applicable	Rainbow sheen may occur when disturbed	No brown oil or brown sheen	

PHASE 2 - REMOVAL		SOIL	SEDIMENT	WATER	COMMENTS
Marshes	TPH	Passes paper towel test	Light surface sheen	No rainbow sheen	TPH = Total Petroleum Hydrocarbons. Representative samples should be analyzed. 2.6 gal./acre-ft = 7 mg/l; 0.32 gal/acre = rainbow sheen (0.9 mg/l) Protection of fish and shellfish from toxicity = PAH of <1 mg/l. Paper towel should not appear oily after contact with dry soil.
	PAH	Region III ERG's (see below)	Region III ERG's	No acute (96 hr. LC50) Toxicity	
Bathing Beaches	TPH	Passes paper towel test	Light surface sheen	No rainbow sheen	
	PAH	Region III ERG's	Region III ERG's	No acute toxicity	
Other Beaches	TPH	Passes paper towel test	Light surface sheen	No rainbow sheen	
	PAH	Region III ERG's	Region III ERG's	No acute toxicity	
Turtle Nesting Areas	TPH	< 1000 mg/kg	Light surface sheen	No rainbow sheen	
	PAH	Region III ERG's	Region III ERG's	No acute toxicity	
Subtidal Zone	Oil	Not Applicable	< 1000 mg/kg	No acute toxicity	
REGION III ERG's (Emergency Removal Guidelines)		SOIL (mg/kg)	SEDIMENT (mg/kg)	WATER (mg/l)	COMMENTS
Polycyclic Aromatic Hydrocarbons (PAH) found in diesel fuel.	Naphthalene	15,600	156,000	7.3	PAH's in JP-5 fuel oil approximately 15.9 %. ERG's based on human health.
	Fluorene	31,300	313,000	14.6	
	Anthracene	235,000	No Limit Set	109.5	
	Fluoranthene	31,300	313,000	14.6	
	Pyrene	23,400	234,000	11.0	

PHASE 3 - LONG-TERM REMOVAL		SOIL (MDE UST)	SEDIMENT	WATER COLUMN	COMMENTS
Marshes	TPH	10 mg/kg	10 mg/kg	Barely visible sheen	2.6 gal./acre-ft = 7 mg/l; 0.04 gal/acre = barely visible sheen (0.1 mg/l)
	PAH	10 mg/kg	SQuiRTs**	No tainting	
Bathing Beaches	TPH	10 mg/kg	10 mg/kg	Barely visible sheen	Protection of fish and shellfish from tainting = PAH of <0.1 mg/l
	PAH	10 mg/kg	SQuiRTs**	No tainting	
Other Beaches	TPH	10 mg/kg	10 mg/kg	Barely visible sheen	Protection of fish and shellfish from toxicity of specific components <1% of 96hrLC50 (approx. 0.1 mg/l)
	PAH	10 mg/kg	SQuiRTs**	No tainting	
Turtle Nesting Areas	TPH	< 3 mg/kg	< 3 mg/kg	Barely visible sheen	
	PAH	< 3 mg/kg	SQuiRTs**		
Subtidal Zone	Oil	Not Applicable	10 mg/kg	No visible sheen	

*Maryland Department of the Environment (MDE) Underground Storage Tank (UST) soil cleanup levels, i.e., “Site-Specific or 10 ppm.”

**Screening Quick Reference Tables (SQuiRTs) effects range median concentrations available from NOAA website.

SUMMARY OF SCREENING QUICK REFERENCE TABLE FOR ORGANICS (NOAA)

SQuiRTs**	SEDIMENT	WATER COLUMN	COMMENTS
Naphthalene	2.1 mg/kg		Screening levels cited indicate reported Effects Range Median values for selected compounds in sediments.
Methylnaphthalene	0.67 mg/kg		
Fluorene	0.54 mg/kg		
Phenanthrene	1.5 mg/kg		
Pyrene	2.6 mg/kg		Water column value for marine water reported as a “value for chemical class,” i.e., PAH.
Fluoranthene	5.1 mg/kg		
Total	44.7 mg/kg	0.3 mg/l	
Benzene		5.1 mg/l	CMC LOEL

Case-by-case variation from these criteria is acceptable upon approval of the Environmental Unit.